Environmental Assessment
Registration Document: Class 1 Undertaking

Yarmouth County Petroleum Contaminated Soil Remediation Facility
South Ohio, Nova Scotia

Prepared for:

Yarmouth County Solid Waste Park Management Authority
27 Courthouse Road, PO Box 10, Tusket, NS B0W 3M0

Prepared by:

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1.0 INTRODUCTION

1.1 Preamble

The Yarmouth County Solid Waste Park Management Authority (YCSWPMA) currently owns and operates the Construction and Demolition (C&D) facility located at 1932 Hardscratch Road, South Ohio, Yarmouth County, Nova Scotia. The Town of Yarmouth currently is contracted to operate the facility. In Figure 1-1 there is an aerial satellite image from Google Earth showing the site as of April 9, 2005 prior to the addition of the transfer station, Household Hazardous Waste (HHHW) depot and C&D site. The Nova Scotia Environment (NSE) file number for the Construction and Demolition disposal facility is 94200-30.

Figure 1-1. The Yarmouth County Solid Waste Management Park. The NSE map series is 20-O/16, and the grid reference is E537646 N4865049.

The C&D Disposal facility received its Approval to Operate on December 17, 2007 and to January 31, 2010 has processed 3470.17 tonnes of C&D waste. The facility's

Approval No. is 2006-053331-A01. Along with the C&D site, the Yarmouth County Solid Waste Management Park (YCSWMP) also includes a materials transfer facility for recyclables, a municipal solids waste (MSW) transfer facility, a public drop off area, a hazardous waste collection depot, a scalehouse, and an asbestos disposal area where the Town of Yarmouth is contracted to operate the facilities.

The YCSWMP is located adjacent to the recently closed landfill (see Figure 1-1). The landfill was opened in 1979 and was operated until 2006. The landfill was an unlined, trench style. While the landfill was operating it received and managed petroleum contaminated soils—typically using the material for landfill cover.

With the closure of the landfill, petroleum contaminated soils must now be shipped to Queens County or other destinations well outside the jurisdiction of the Municipality of the District of Yarmouth (MODY). This has significantly increased the costs of site remediation in the Yarmouth area and is inhibitory to undertaking site remediation. With a desire to restore this essential service to the service area of Region 7, YCSWPMA has initiated the process to construct a new petroleum contaminated soil treatment facility (Appendix A). The current YCSWPMA works in partnership with the other service areas as depicted in the figure below (see Figure 1-2).

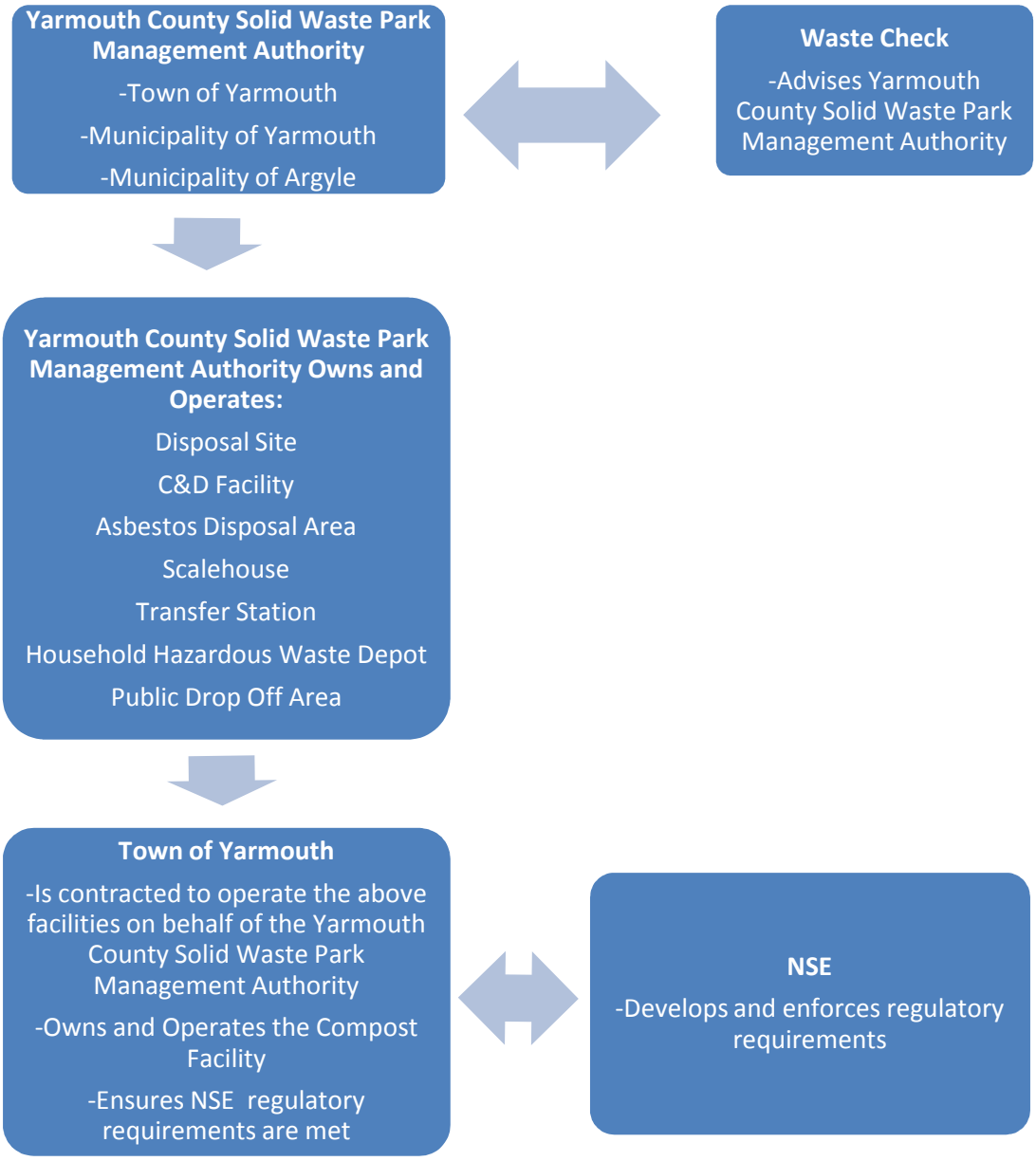


Figure 1-2. The YCSWPMA Organizational Chart.

The proposed Yarmouth County Petroleum Contaminated Soil Remediation Facility will be located in between the transfer facility and the compost facility and will make use of the existing infrastructure.

Unlike the original facility in which the contaminated soil material was not actively managed, the proposed facility is designed to produce soils that are treated by maintaining aerobic, unsaturated conditions such that the rate of remediation is accelerated and the retention time on the operating pad is minimized. The finished soils will be used as operational fill on the site and will not leave the site. The fill will be used in the C&D operation as top cover, fire break material, and as common fill for construction of the C&D cells.

The NSE's permitting process for "a facility for treating, processing or disposing of contaminated materials that is located at a site other than where the contaminated materials originated" now requires a Class I Environmental Assessment (EA) be completed on the operation of a facility that manages contaminated materials. The following registration document has been prepared to conform to the new requirement.

1.2 Undertaking Registration

1.2.1 Name of the Undertaking

Yarmouth County Petroleum Contaminated Soil Remediation Facility

1.2.2 Location of the Undertaking

1932 Hardscratch Road, South Ohio, Yarmouth County, Nova Scotia

1.2.3 Proponent

Name: Yarmouth County Solid Waste Park Management Authority
Mailing Address: 27 Courthouse Road, PO Box 10, Tusket, NS B0W 3M0

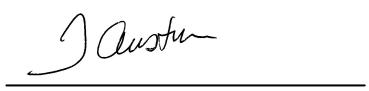
1.2.4 CAO of Proponent

Alain Muise CA

1.2.5 Contact Person

Alain Muise, CA
Chief Administrative Officer of the Municipality of Argyle
27 Courthouse Road, PO Box 10, Tusket, NS B0W 3M0
Phone: (902) 648-2311
Fax: (902) 648-0367
Email: admuise@munargyle.com

1.2.6 Signature of Signing Officer



Tom Austin, M.Sc., P.Eng., President of ABL Environmental Consultants Ltd. on behalf of Alain Muise, CA, Chief Administrative Officer of the Municipality of Argyle

1.3 Sources of Public Funding

This project will be 100% publicly funded by the three municipalities using their own funding sources. A portion of the funding will come from the Build Canada Fund.

The Yarmouth County Petroleum Contaminated Soil Remediation Facility has the potential to be a financially sustainable operation. The payoff period of the capital investment will be in the range of 5 to 10 years, depending upon the volumes of contaminated soils received. The tipping fee will be in the range of $40 to $55 per tonne. Potential savings in reusing remediated contaminated soil as cover material in the existing C&D facility operations will also be realized, and have not been included in the payoff period calculation.

1.4 List of Required Approvals and Forms of Authorization

1.4.1 Environmental Assessment

The Yarmouth Petroleum Contaminated Soil Remediation Facility falls under Part IV Environmental-Assessment Process of the Nova Scotia Environment Act and is an undertaking in the “Waste Management” category. The applicable Class 1 description is as follows: “A facility for treating, processing or disposing of contaminated materials that is located at a site other than where the contaminated materials originated.”

1.4.2 Approval to Construct

To be issued by Nova Scotia Environment.

1.4.3 Approval to Operate

To be issued by Nova Scotia Environment.

1.4.4 Industrial Approval

The Yarmouth Petroleum Contaminated Soil Remediation Facility will require an Industrial Approval under Part V Approvals and Certificates of the Nova Scotia Environment Act. An industrial approval will be applied for after a successful Environmental Assessment Registration.

2.0 PROJECT DESCRIPTION

2.1 Nature of the Undertaking

The current site exists as a waste management park. The intention of this project is to provide a facility for disposal and treatment of petroleum contaminated soils in the Region 7 area. The area indicated in the site layout (Appendix A) will be complete with a liner system consisting of (from the top down): 600 mm Type 2 gravel, geotextile, geonet, geotextile, HDPE 60 ml liner, and 150 mm of sand on a graded proof rolled base. The liner will drain into a leachate collection pipe and oil/water separator. On top of the liner system a precast concrete retaining wall system will be installed. The liner system and concrete retaining wall system will be referred to as a "soil treatment bunker" or simply "bunker". Approximate dimensions of the bunker will be 3 m high by 142 m x 25.4 m. The leachate containment system is designed to capture all the leachate from the facility with the HDPE liner providing the ultimate barrier. The liner drains into the oil water separator then to the ditch where it is collected in the storage pond.

Upon arrival at the YCSWMP, reports on the soils will be submitted to the scale operator. The soils will be weighed and unloaded onto the lined screening area. The load will be screened with a vibratory or trommel screen to separate rocks greater than two inches. The rocks will be assessed as to their contaminant content. It they are dry and free of residual earth, they will be removed from the pad and used/disposed of elsewhere on-site; if residual earth is present on the rocks, they will be dried and re-screened before use/disposal; if they are porous, they will remain with the soil and experience the same treatment process as the soil. The screened load will be added to the bunker. When a load is added to the bunker, the soils in the entire bunker will be shifted towards the end with a loader. Loads received at the end of the day will be covered with tarps to control moisture and processed the following business day.

The soil will be treated for an approximate 15 month term. The finished soils will be sampled and sent to a CAEL certified lab. Finished soils will be used as cover in the C&D facility. Whenever rainfall is predicted the soil will be covered with tarps.

2.2 The Purpose and Need of the Undertaking

There is both an environmental and economic need for a petroleum contaminated soil remediation site in the MODY since the closest contaminated soil disposal site is located at the Region of Queens Waste Management Facility which is 183 km one way from the YCSWMP. The advantages to developing a petroleum contaminated soil remediation site in MODY would be both monetary and in greenhouse gas savings. The contaminated soils accepted by Region of Queens Waste Management Facility for the previous three years that could reasonably have been diverted to the proposed

Yarmouth facility were averaged to yield a yearly quantity of 5938 tonnes. The savings potential would be approximately $118,750 per year. The resulting greenhouse gas savings would be approximately 16,360 kg per year based on the reduced transportation requirement. This savings calculation includes the additional emissions from the front end loader operation during the soil remediation process. Both cost and greenhouse gas savings do not take into account the environmental benefits of having the soil treated, then subsequently used at the Yarmouth facility, as opposed to landfilled untreated in the Region of Queens Waste Management Facility. The diversification of this site will also expand the skill set of the operators and provide an estimated 1.25 man-years/yr of additional local employment. Required investment in the project is also much less than a stand-alone operation, since the proposed facility could cost-share existing capital infrastructure (scales, roads, loaders, screeners) with other operations within the YCSWMP. Finally, the Yarmouth site will bio-treat the contaminated soils over 15 months to Atlantic Risk Based Corrective Action (RBCA) limits for industrial sites. This limit will exceed the spirit of the RBCA guidelines since the finished soil will be applied on-site as a landfill cover or for firebreaks in the C&D site. This is preferable to the alternative method of simply landfilling untreated contaminated soils.

2.3 The Proposed Construction and Operation Schedules

Construction is anticipated to begin in the spring of 2011. The facility is expected to open to receive contaminated soil three months later. The planned stages of construction are found in the following table.

Table 2-1. Preliminary Construction Schedule

Activity	Date
Acquisition of Equipment	May
Surface Preparation	June
Treatment Process Development	July
Staff Training	August

Facility operations will coincide with operations within the YCSWMP, Monday–Friday 8:30 am-16:30 pm and Saturdays 8:30 am-12 pm.

2.4 Description of the Undertaking

2.4.1 Site Size

Preliminary design calculations were performed based on the quantities of contaminated soil received at Region of Queens Waste Management Facility on the largest year from the area which will be redirected to the proposed South Ohio facility. The operating pad has dimensions of 142 m x 25.4 m and is capable of actively managing 7600 tonnes of petroleum contaminated soil each year. This provides a factor of safety in the capacity of the site compared to the annual average of about 6000 tonnes. Though a safety factor has been included, the actual processing space may need to be increased upon construction or after the facility is up and running.

2.4.2 Accepted Materials

Soils containing benzene, toluene, ethyl-benzene, xylene (BTEX) and petroleum hydrocarbons will be received. Typically, petroleum contaminated soils accepted at the site will include those soils with a Total Petroleum Hydrocarbon (TPH) concentration of less than 10,000 mg/kg. The acceptance of soils with a TPH that is greater than 10,000 mg/kg will require the permission of the NSE. Soils containing metals at or below commercial/industrial levels as stated in the Canadian Soil Quality Guidelines (September 2007) will also be accepted.

2.4.3 Prerequisite Feedstock Details

Prior to the arrival of the contaminated soil on site, the nature of the contaminant(s) must be disclosed in addition to the approximate tonnage and the corresponding contaminant concentration and organic matter content.

2.4.4 Feedstock

Once the nature of the contaminated soil has been documented and if there is sufficient storage space on site, it will be delivered to the Yarmouth site according to transport Canada regulations pertaining to petroleum contaminated wastes. Depending upon the contaminant, the concentration, the organic matter content, the moisture content, and the time of delivery, it will be directed to the processing area on the pad.

All soils will be screened before processing. Screened unsaturated petroleum contaminated soils with a modified TPH below 4000 mg/kg and an organic content at or above 4% will be immediately added to an operating bunker.

Screened, petroleum contaminated soils with a modified TPH at or above 4000 mg/kg, or with an organic content below 4%, or in a saturated state, or delivered late in the day will be sequestered to a covered holding bunker. These soils will be amended with

ground wood waste from the adjacent C&D facility prior to processing in the operating bunker.

2.4.5 Aeration

The aerobic bio-decomposition of contaminants within soil requires a sufficient amount of oxygen (typically above 10%) to support microbial activity. To provide adequate aeration to the bunkers, they will be rotated and shifted in the bunker by the operator with the front end loader as each advanced batch is finished and removed. The actual oxygen concentration in the piles will be measured by the operator at 10 m intervals on a weekly basis to determine if the rate of agitation is sufficient. If the oxygen content is below 10%, the soil will be moved in more frequently. During the period of December-March, it is anticipated that the decomposition process will be slowed such that less or no active management will be required however, space will still be provided to accept incoming material.

2.4.6 Moisture Control

Since the decomposition of contaminants takes place within the pore spaces of the contaminated soil, it is essential to maintain those pores in an unsaturated state. To that end, it is necessary to maintain the remediated soil matrix below its saturation point (typically around 15%). Piles should be maintained at a moisture content between 60 and 80% of their saturation point (typically between 9 and 12%) by measuring the moisture content of representative samples on a weekly basis. Since the bunkers will frequently be covered by tarpaulins, the addition of water is controlled. Bunkers containing soil below 8% will be moistened with water to achieve optimum moisture levels.

2.4.7 Temperature

Like composting typical organic wastes, the decomposition of contaminated soil is an exothermic process, but the rate of decomposition and release of energy is lower. Consequently, although there will be an increase in temperature, it will typically not exceed 35^{o}C. Although measuring the temperature of the contaminated soil will not be as meaningful as that of typical organic waste compost, temperatures above ambient conditions will indicate some degree of active decomposition. Measuring the temperature of piles on a weekly basis is recommended.

2.4.8 Turning & Covering the Pile

The operational plan is intended to maintain a rate of decomposition that treats the contaminated soil to Atlantic RBCA limits within 15 months. This rate of remediation is within the average rates posted in the literature (Song et al., 1990; Huesemann and Truex, 1996). In the event that the rate of remediation is less than that expected,

measures will be taken to increase the remediation rate through more frequent turning, the addition of a nitrogen source, or the inclusion of bio-vents to increase the soil's exposure to oxygen. The rate of decomposition depends to a large degree upon the nature of the feedstock and maintaining the material in an aerated, unsaturated state provided in the covered turned bunker. Therefore, it is necessary to monitor the conditions within the pile on a regular schedule and turn the pile or add amendments if conditions are not within the advised limits, or if the rate of decomposition is below anticipated rates.

2.4.9 Testing

The rate at which the concentration of soil contaminants is reduced depends upon the management of the material, environmental conditions and the initial concentration of the contaminant and therefore doesn't follow a strict schedule. Estimating when a contaminated soil has reached a point where the contaminants are below acceptable limits will depend on the release of volatile organic compounds (VOCs) as measured with a portable VOC meter. At the point when VOC reading at the soil surface is below 15 ppm (or an originally determined threshold based upon on-site experience), it will be sent to a CAEL certified laboratory for testing.

The sample (consisting of twenty points within piles under 500 tonnes and 40 points within piles up to 1000 tonnes) is sent to an accredited lab and tested for benzene, toluene, ethylbenzene and xylene (BTEX), and various hydrocarbon fractions (C_6-C_{10}, C_{10}-C_{21}, and C_{21}-C_{32}) that are then consolidated in terms of Modified Total Petroleum Hydrocarbons (TPH).

The results are then compared against the Atlantic RBCA Version 2 Guidelines (Table 7: Tier I Risk-based Screening Level (RBSL) Table: Soil (mg/kg)) for a non-potable, commercial receptor with the appropriate soil type to determine if the contaminated soils can be removed from the pad. The appropriate soil type (coarse-grained or fine-grained) is described in Appendix 8 of the RBCA Standards (Version 2); coarse-grained soils have greater than 50% (by dry weight) of their particles equal to or greater than 75 microns (200 mesh) in diameter while fine-grained soils having greater than 50% (by dry weight) of their particles equal to or less than 75 microns (200 mesh) in diameter. Once the standards are met, the material will be used elsewhere on site for C&D cover, common fill and fire breaks.

In addition to sampling soils at the conclusion of the remediation process, samples from distinct batches will also be tested at a minimum on a semi-annual basis to determine the progress of the remediation process and to determine if additional amendments are required to accelerate the rate of decomposition.

2.4.10 Soil Amendment

If the rate of remediation is such that the residency time within the treatment area is expected to exceed 15 months, or if there is a need to accelerate the decomposition process due to limited space, additional organic amendments will be mixed with the contaminated soil to provide additional porosity and nutritional value in terms of a carbon and nitrogen source to increase microbial activity. Ground wood waste from the adjacent construction and demolition site will provide sufficient porosity, a high source of carbon and some nitrogen. If it is determined that additional nitrogen is required, high-nitrogen waste products can be incorporated, provided the material remains in an unsaturated state.

2.4.11 Odour Control

Although contaminated soils contain organic compounds, many of which are easily volatilized, concentrations are relatively low, volatilization is slow and ambient air concentrations are quickly dissipated. The release of volatile compounds will be highest when the material is turned. It is anticipated that there will be no detection of odorous compounds beyond the perimeter of the waste management facility due to operations within the soil contaminated site. In the unlikely event that material is received on-site that poses a threat of releasing odours beyond the waste management facility's perimeter, it will be immediately amended with ground wood to absorb volatile constituents and effectively reduce the release of odorous compounds.

2.4.12 Records

Records as to origin will be kept for all deliveries of soils to the site.

As the rate of remediation depends to a large extent upon the nature of the contaminated material as it is received, it is important to fully document the incoming soil. Parameters for the incoming soil will dictate whether additives are required and include (Table 2-2 below):

- Contaminant
- Mass of contaminated soil
- Concentration of contaminant
- Organic matter content of clean soil
- Soil type (fine-/coarse-grained)
- Moisture saturation point
- Density

Table 2-2. Record for Incoming Soil.

Record Date	Source	Contaminant	Tonnage (tonnes)	Contamination Concentration (mg/kg)	Organic Matter Content (%)	Soil Grain (Coarse/ Fine)	Moisture Saturation Point (%)	Density (kg/L)	Pile Assignment Number

Table 2-3. Record of Management Conditions.

Date	Pile Number	Pile Turned	Moisture Content	Temperature	TPH

Once the material is received on-site and its relative contamination is determined, it is screened for large rocks and started as a batch in the primary stage of the bunker. High-concentration batches in the bunker will have a longer residence time and may require more attention to organic matter content, moisture controls and turning frequency. The management of the material in all bunkers is documented in terms of (See Table 2-3):

- Turning frequency
- Moisture content
- Temperature
- TPH

2.4.13 Contingency Plan

The treatment of contaminated soils is an inexact science due in part to the number of variables that can have an impact on the rate of contaminant removal. Thus, it is important to establish a number of contingencies in order to control unexpected outcomes:

- The installation of an oil-water separator at the lowest corner of the pad provides for the separation and retention of any water and solid borne contaminants from the process pad which may be mobilized through rain events on unprotected soil.
- The provision of a woody or nitrogen-based amendment to increase the rate of decomposition if it is determined that the rate of decomposition is insufficient.
- The provision of woody material to suppress the release of volatile organics if it is deemed necessary.
- If the facility receives soil where it is up to capacity and there is not a batch ready to be removed, any new petroleum contaminated soil will be refused. Notification of applicable clients will be made as soon as feasible.
- In the storm water ditches on the way to the pond and in the sedimentation control pond (downstream of the entire YCMSWP) oil absorbent booms will be installed as well as at the pond outlet.
- All piles will be covered with tarps to prevent erosion losses.

3.0 ENVIRONMENTAL BASELINE INFORMATION

The YCMSWP and surrounding area are characterized as undulating to gently rolling topography, sloping one to four percent to the east-southeast. The area is blanketed by glacial till consisting of a poorly sorted mixture of sand, silt, gravel and boulders with some clay. Geological mapping indicates till thickness ranging from 1 to 10 m (average 3 m). This was confirmed during and installation of eight monitoring wells by Dillon Consulting Ltd. (Dillon) in 2006.

Hydraulic conductivity (k) of the till unit (also determined during the monitor well installation program) is in the order of 10^{-5} cm/sec. The underlying bedrock is Devonian age granite. The fractured upper fractured surface (RQD values ranging from 36 to 100%) exhibits a higher k-value, while the more competent lower zones exhibit a lower value. The water table occurs near surface (generally within 3 m). Groundwater flow direction is east-southeast.

No rare or endangered species were identified by Dillon's team and subsequent biological monitoring has not revealed any species of concern or any impacts related to existing activities.

A groundwater sampling event was completed in October 2006 following installation of eight monitoring wells at the YCMSWP. From October 2008 to June 2009, groundwater and surface water samples were collected by Dillon on four occasions as part of the C&D Site and MSW Transfer Station operational monitoring program. Samples were tested for general inorganic chemistry and metal parameters and, less frequently, organic compounds. Groundwater data were assessed in comparison to Canadian Drinking Water Quality (CDWQ) Guidelines as well as background levels at the site.

The results indicate acidic (low pH) water as well as elevated concentrations of colour, iron, manganese, turbidity and total dissolved solids (TDS). Recommended limits for all these parameters except turbidity are in effect for aesthetic reasons. The recommended limit for turbidity is in effect for both aesthetic and health reasons, although the latter generally only applies to chlorinated water supplies. With the exception of toluene (organic compound) in one sample, organic compounds were not recorded as guideline exceedances.

In comparison to background levels, a general increase in a number of inorganic indicator parameters was noted on the south side (downgradient) of the C&D landfill; however, at this time the difference is not considered significant. In addition, a number of indicator parameters in groundwater below the Material Processing Stockpile were elevated relative to other sampling locations.

The current groundwater monitoring network consists of eight monitoring wells at various upgradient and downgradient locations at the C&D Landfill and Transfer Station sites. The wells are terminated in the till/bedrock interface (except MW-06-7 which is screened in bedrock only) in consideration of the shallow water table conditions. Recommendations for continued C&D Landfill and Transfer Station groundwater monitoring were provided in the 2008-2009 Annual Monitoring Report. They included collection of groundwater samples for Nova Scotia Environment's Construction and Demolition Debris Disposal Site Guidelines on a quarterly frequency (Schedule 1 Column 2 indicator parameters during three events and Schedule 1 Column 1 comprehensive list of parameters on one occasion).

The monitoring wells currently in place were established to specifically monitor the C&D Landfill and the Transfer Station at the YCSWMP. The monitoring wells located on the YCSWMP site were not designed to monitor for hydrocarbons or to specifically monitor the proposed Yarmouth Petroleum Contaminated Soil Remediation Facility. The existing monitoring wells do provide a good hydrogeological profile of the site needed to design a monitoring program specifically for the Yarmouth Petroleum Contaminated Soil Remediation Facility. During detailed design of the facility, a hydrogeologist will be retained to design an appropriate monitoring program. The monitoring program will include the design and locations of additional wells needed in order to adequately monitor the site for hydrocarbons.

With regards to analytical testing, based on the intended treatment of petroleum hydrocarbon impacted soil, future groundwater monitoring should include Total Petroleum Hydrocarbons (TPH) and benzene, toluene, ethylbenzene and xylenes (BTEX), and potentially polycyclic aromatic hydrocarbons (PAHs) and metals.

There are no abandoned mines within 500 meters of the facility, however there is an abandoned mine within 1000 meters. It was a mine for mica in Brooklyn, Yarmouth County. The mine identification # was BMA-1-001, it operated under the name of E.S. Matheson & Associates Shaft and the NTS map is 20O/16D. There is a quarry 860 meters from the site.

There is a residence within 500 meters of the proposed facility.

All agricultural areas are at least two kilometers away from the facility.

The ambient environment of the proposed facility is all classified as a brownfield site as it is approved for development into a solid waste park.

4.0 ACTIVITY, IMPACTS AND MITIGATIONS

Table 4-1. Activities and Potential Impacts

Activities	Potential Impact							
	Air	Water		Soil	Flora	Fauna	Aquatic Habitat	Tourism
		Ground	Surface					
4.1 Construction	✓	✓	✓	✓	✓	✓	✓	✓
4.2 Transportation	✓							✓
4.3 Processing		✓	✓	✓		✓	✓	
4.4 Operations	✓	✓	✓			✓	✓	✓
4.5 Visual	✓	✓	✓					✓
4.6 Project Closure	✓	✓	✓	✓	✓	✓	✓	✓

Mitigation

4.1 Construction

The primary concern during construction is the potential erosion from the construction area. All sedimentation and siltation guidelines will be followed during construction, dust control will be implemented as necessary, and ongoing ground, and surface water monitoring will continue.

4.2 Transportation

The primary concern will be the potential for dust during transportation. All transportation rules and regulations will be followed and all truck loads will be covered. The trucks will be accessing the facility through all roads which lead to the facility and permit truck traffic. Dust control will be used as it is used in the current operations of the site; suppressed by the application of water sprays, or the application of other suitable dust suppressants approved by the NSE. All deliveries will be weighed at the scale house and accurate records will be maintained. Operation of the facility will result in increased truck traffic by approximately 300 trips per year to the site, as truck capacity is about 20 tonnes.

4.3 Processing

The primary concerns are loss of soil through erosion and production of leachate by draining piles. In order to mitigate any impact to aquatic habitat, ground, or surface water, the processing of the petroleum contaminated soils will be completed on lined pads and contained in the lined bunker. All contaminated soils will be covered by tarps while on the processing site. The bunkers will be covered with tarps to prevent entry of rainfall which could mobilize contaminants and/or soil. Leachate formation will be minimized, if not eliminated. Any leachate that does occur will be collected, treated in an

oily water separator and monitored. Fauna is not generally attracted by site activities and exposure is not predicted to be a problem.

4.4 Operations

Any odours from the petroleum contaminated soils treatment will be minimal; no mitigation will be necessary. Rainfall is the biggest risk to the project because it has the ability to mobilize contaminants and soils from the treatment piles and to slow the process of treatment by saturating the piles. Rainfall will be controlled by covering all piles while in the process of being treated. Piles must be exposed during testing and during any active turning, these events will be scheduled for dry weather.

4.5 Visual

The petroleum contaminated soils site will be 3 m high and is not anticipated to have any visual impact to adjacent land uses. The use of the finished material to restore the C&D site will enhance the overall site at time of closure.

4.6 Project Closure

When the petroleum contaminated soils facility is no longer needed, the required NSE closeout documentation will be prepared and submitted to NSE for approval. NSE's terms of the facility's closure will be followed. The primary concern is the prevention of erosion from the disposal site. This will be addressed in the closure of the C&D site operations.

4.7 Tourism

There are no known tourism operations within one kilometer of the petroleum contaminated soils facility. There should be no detectable impact to the regional tourism industry. There will be no detectable odours from this additional activity on this site. The operational noise levels will be monitored periodically to ensure they are not breaking the MODY Noise By-law N-050-03.

5.0 STEPS TAKEN OR PROPOSED BY THE PROPONENT TO IDENTIFY AND ADDRESS THE CONCERNS OF THE PUBLIC AND ABORIGINAL PEOPLE

5.1 Public Information Method

Public Consultation has been completed in accordance with the EA guidelines. The proponent created a website for the proposed project and advertised the address in the paper. A letter to the local Aboriginal band directing them to the website was also

issued. The website contained the report and drawings, available for download, and hard copy was available at each of the offices of YCSWPMA members. Each of the YCSWPMA's member websites linked to this website, which had a public comments section. On entering name, address, and phone number in the secure fields, a comment was permitted. The website was equipped with a counter so that the number of site visitors was known.

6.0 LIST OF CONCERNS REGARDING THE UNDERTAKING EXPRESSED BY THE PUBLIC AND ABORIGINAL PEOPLE

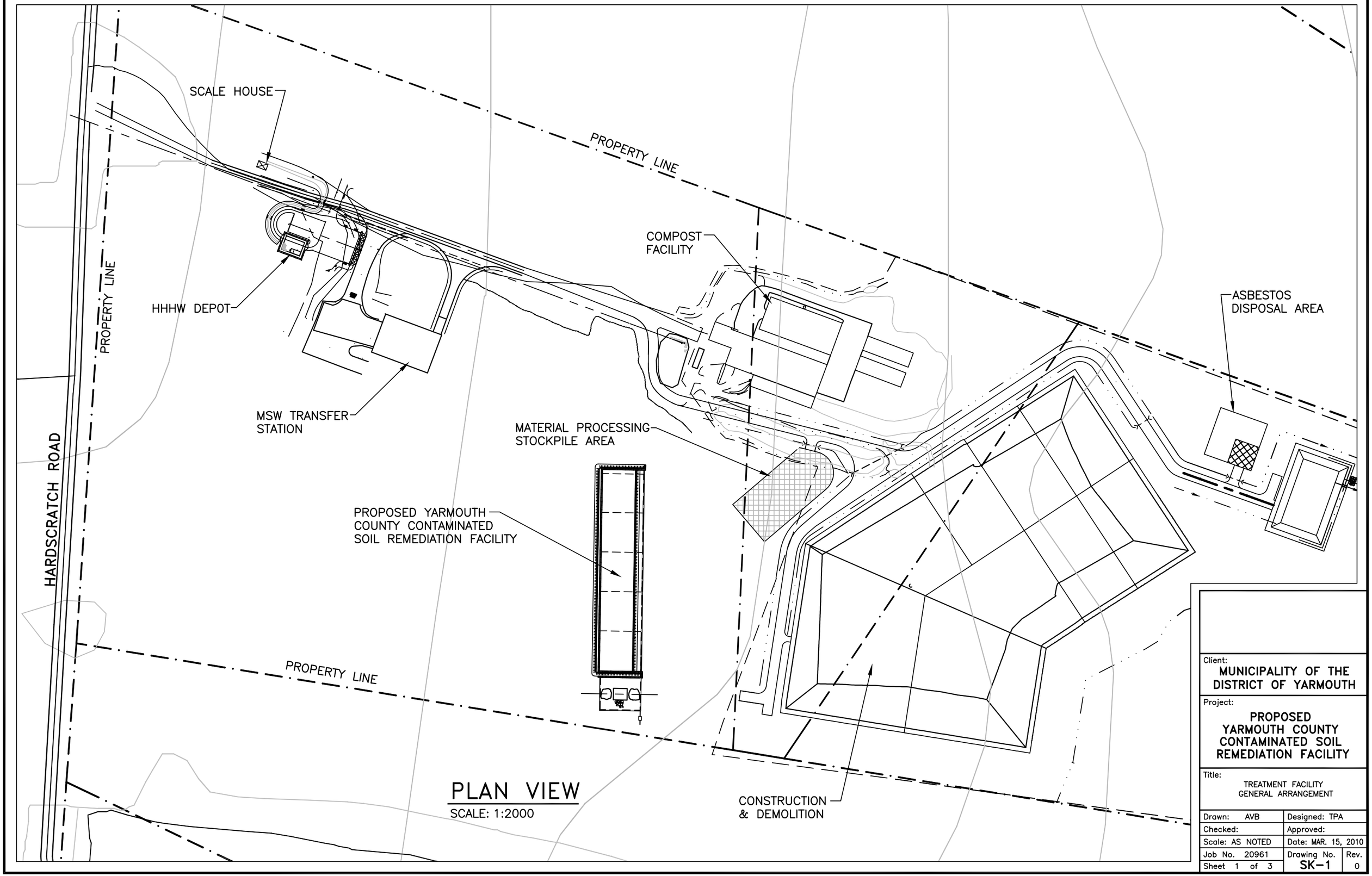
There were no comments received either directly by YCSWPMA members or from the website query. The website was open for comments on April 26 until May 24. The counter registered 60 visitors during the four week period.

References

Huesemann, M.H. and M.J. Truex. 1996. The role of oxygen diffusion in passive bioremediation of petroleum contaminated soils. Journal of Hazardous Materials 5 (1): 93-113.

Song, H., X. Wang and R. Bartha. 1990. Bioremediation potential of terrestrial fuel spills. Applied and Environmental Microbiology 56 (652-656).

APPENDIX A: Conceptual Design



PLAN VIEW

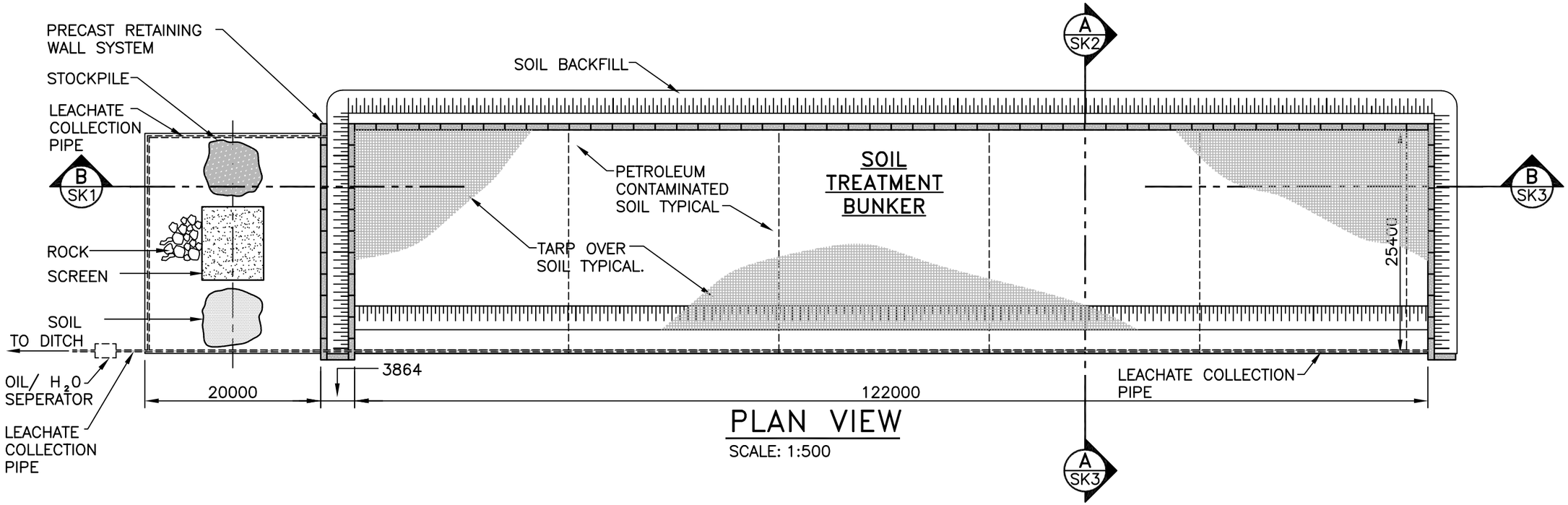
SCALE: 1:2000

Client:
MUNICIPALITY OF THE DISTRICT OF YARMOUTH

Project:
PROPOSED YARMOUTH COUNTY CONTAMINATED SOIL REMEDIATION FACILITY

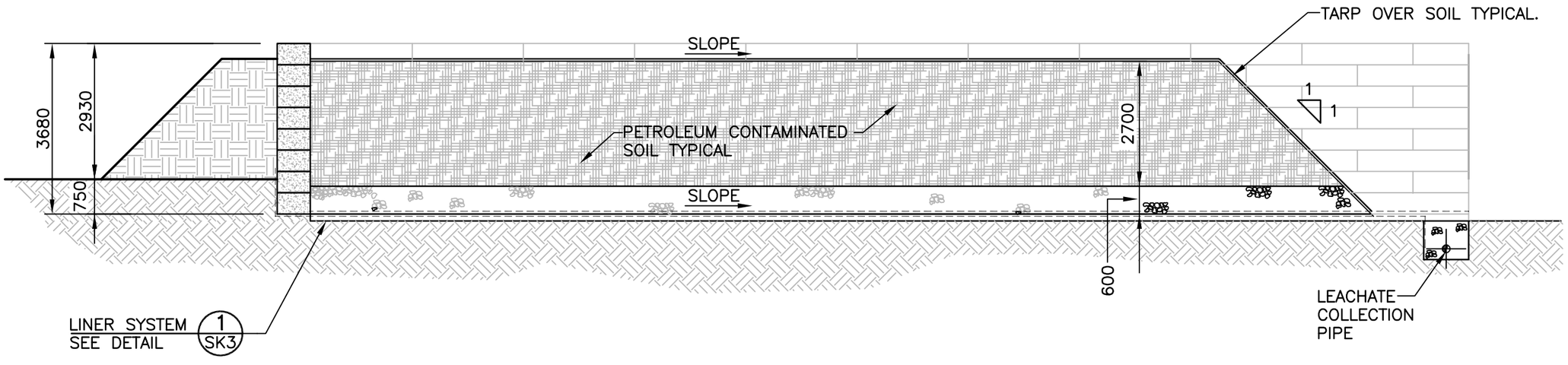
Title:
TREATMENT FACILITY
GENERAL ARRANGEMENT

Drawn: AVB	Designed: TPA	
Checked:	Approved:	
Scale: AS NOTED	Date: MAR. 15, 2010	
Job No. 20961	Drawing No. SK-1	Rev. 0
Sheet 1 of 3		



PLAN VIEW

SCALE: 1:500



SECTION

SCALE: 1:100

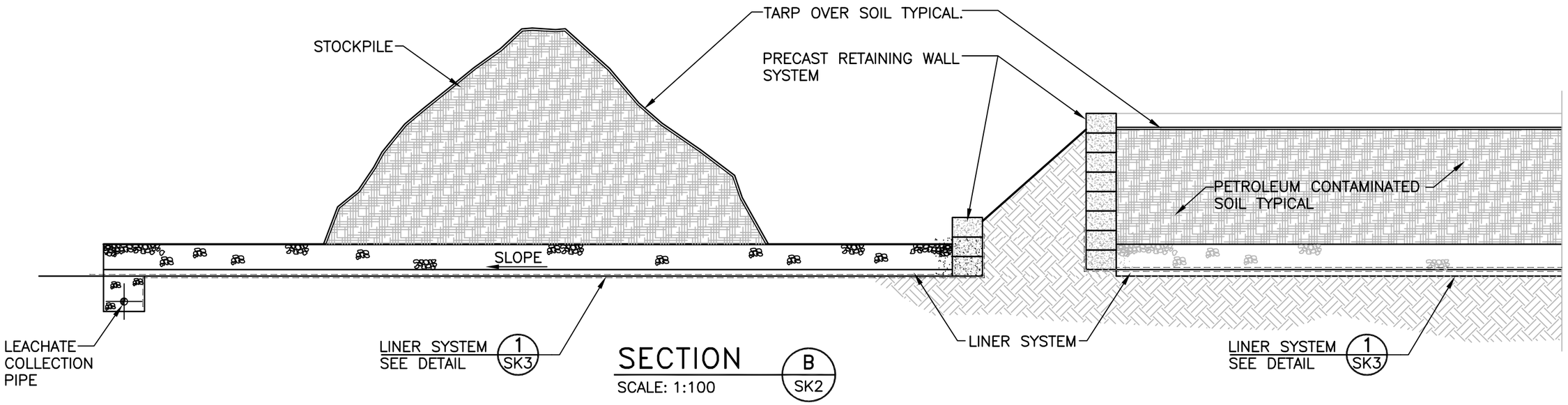
A SK-1

Client:
MUNICIPALITY OF THE DISTRICT OF YARMOUTH

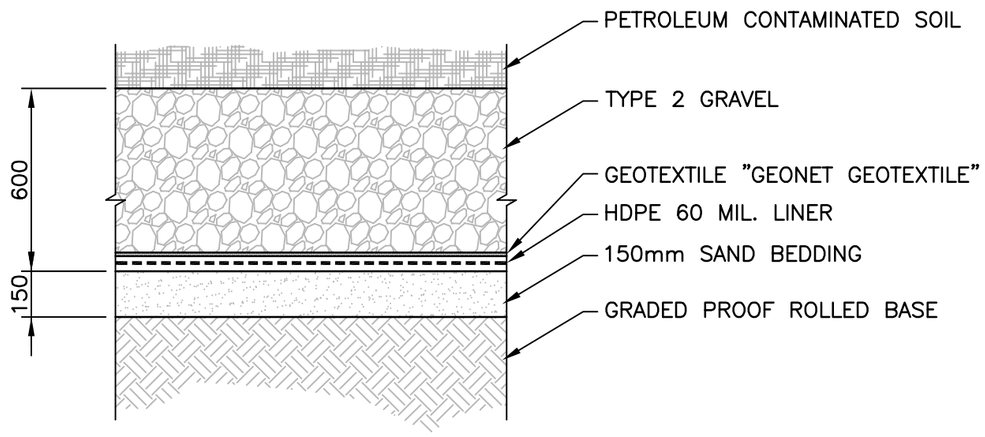
Project:
PROPOSED YARMOUTH COUNTY CONTAMINATED SOIL REMEDIATION FACILITY

Title:
TREATMENT FACILITY
PLAN AND SECTION

Drawn: AVB	Designed: TPA
Checked:	Approved:
Scale: AS NOTED	Date: MAR. 15, 2010
Job No. 20961	Drawing No. SK–2 Rev. 0
Sheet 2 of 3	



SECTION B
SCALE: 1:100 SK2



LINER SYSTEM

DETAIL 1
SCALE: 1:20 SK-3

Client:
MUNICIPALITY OF THE DISTRICT OF YARMOUTH

Project:
PROPOSED YARMOUTH COUNTY CONTAMINATED SOIL REMEDIATION FACILITY

Title:
TREATMENT FACILITY SECTION AND DETAIL

Drawn: AVB	Designed: TPA
Checked:	Approved:
Scale: AS NOTED	Date: MAR. 15, 2010
Job No. 20961	Drawing No. SK-3 / Rev. 0
Sheet 3 of 3	